

# Chapter 11 - Annotating and Plotting Sheets

## Understanding Text and Text Styles

After creating the sheet file, you can now annotate the sheet using MicroStation's text tools and dimension the drawing with the dimensioning tools.

### **Text Styles**

Text Styles provide a method of saving and applying text attributes in MicroStation. They function similar to styles used in word processing software, saving text setups that include font, height and width, line spacing, color, etc. When you apply a style, it's like applying a whole set of characteristics in one step. Once the style is applied, the text is linked to the style and any future changes to the style will update all text currently using the style. The text style contains attributes like font, height, width, line spacing, line length, text justification, etc.

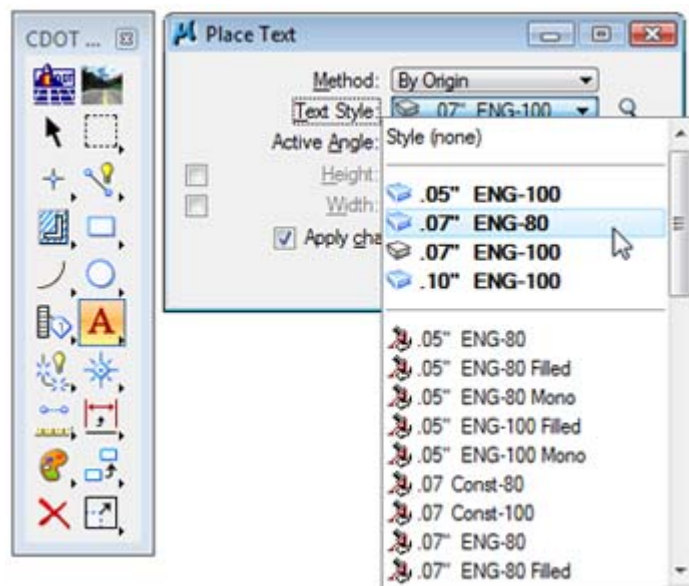
### **CDOT Text Styles**

CDOT text styles are saved in a DGNLIB file called **CDOT-Text & Dim Styles.dgnlib**, located in the **C:\Workspace\Workspace-CDOT\_XM\Standards-Global\MicroStation\DGNlib\Standard** folder. This file is automatically attached to any design file opened in the CDOT workspace. This way, you will always have your text styles loaded. Using Text Styles is a very effective in standardizing text throughout a project or agency.

CDOT text styles are categorized by text size (e.g. .07", .10", .14", etc.) Each style is one of two types – 100 or 80 (e.g. **.07" ENG 80**). 100 styles have the same text height and width. 80 styles are proportional sized – the text width is 80% of the text height.

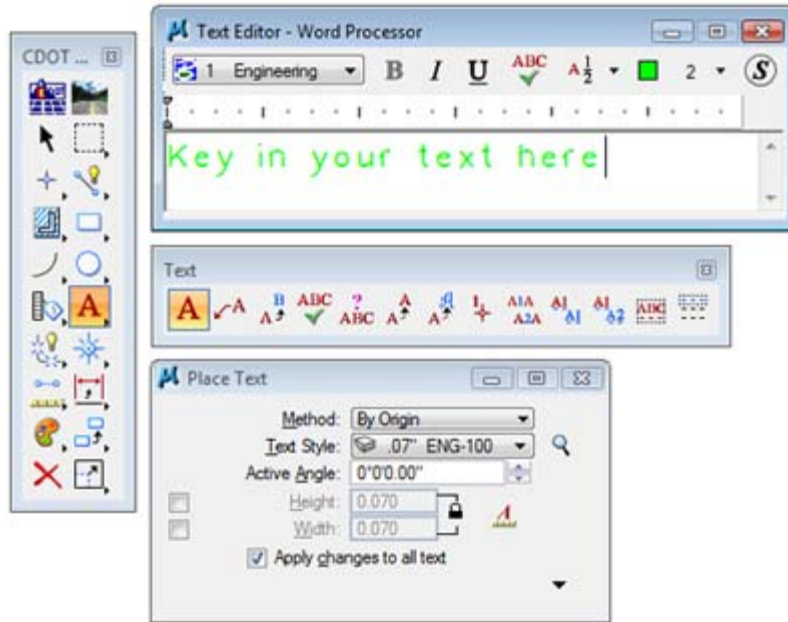
### **Text Toolbar**

The Text toolbar is used to place and edit text. When you place text, you specify a Text Style to apply to the text.



## Place Text

Places text that you enter into the **Text Editor — Word Processor** window. The MicroStation Text Editor uses some basic word processing format options (font, bold, underline, italics, etc.), which allows for quick text manipulations. You can change these attribute per letter, word or string within a text block.



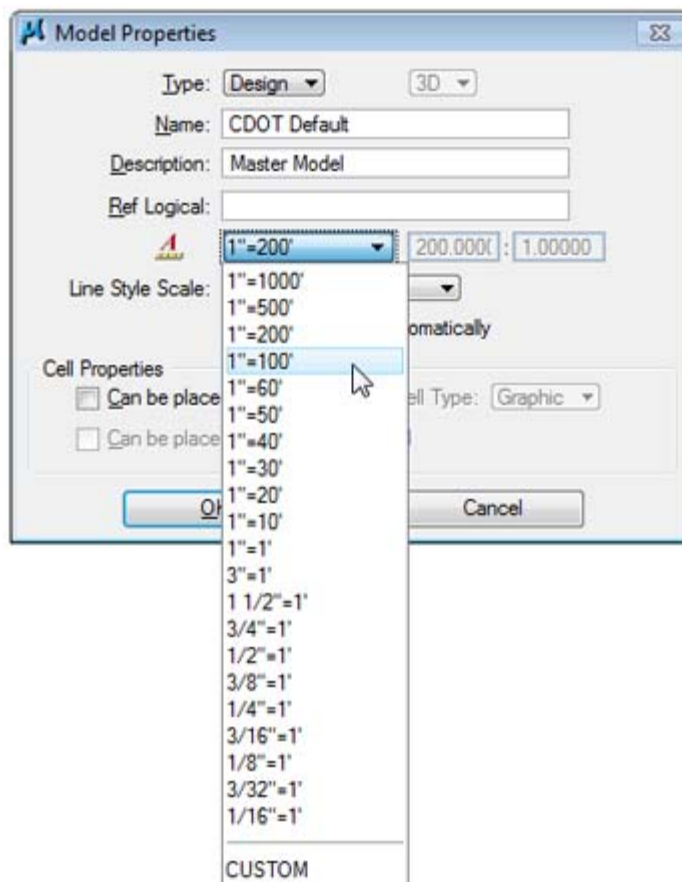
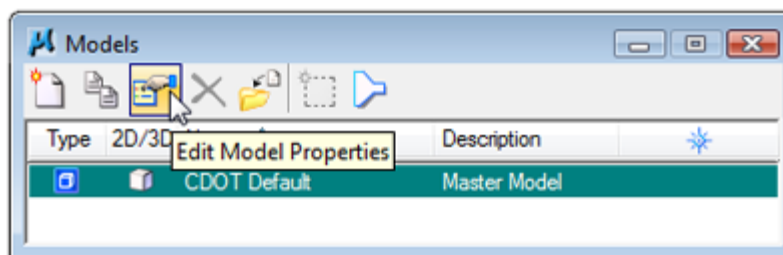
Other word processing functionality includes checking spelling prior to placing text and using **Cut**, **Copy** and **Paste** between MicroStation and other Windows applications.

Text is placed using active text and design file parameters including:

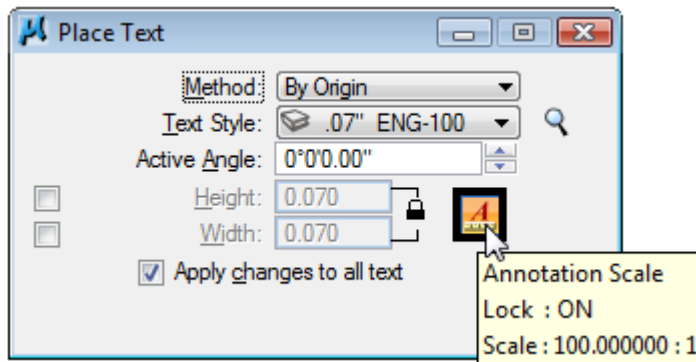
- ◆ Active element symbology (color, weight)
- ◆ Active level
- ◆ Active angle and
- ◆ Text style.

### Drawing Scale

Before placing text, check the **Annotation Scale** for text under **Model Properties**. The **Annotation Scale** is set to **100**, by default, in the CDOT seed file. This should be the same as your plot scale. If you're plotting at any other scale, change the **Annotation Scale** here. Any text that you've previously placed will be updated (i.e. you don't have to delete and replace the text – it will be re-scaled automatically).



**Note:** To enable scaling of text, make sure that the Annotation Scale lock is turned on in the Place Text command before placing your text.



For more information on text, see the CDOT CADD Manual, *Chapter Five – Drawing Standards, Section 5.4 Standard Annotation*.

Level symbology overrides have only been created for Topo levels and some existing traffic signing levels. These overrides have been created in order to view existing features on the screen in a grayed out color. The overrides are typically assigned to levels attached as reference files through the level manager.

### 5.4 Standard Annotation

CDOT standard Annotation utilizes a Text & Dimension Style (DGN/BE) file called CDOT.Text & Dim Styles.dgn. This library contains many predefined text and dimension settings for several different sizes and widths of text called Text Styles. The text styles include the use of a single MicroStation Font Resource file called CDOT\_FONT.rsc. The Library is attached to all Design files through the use of configuration variables and the select group environment utility. Normally, when a user selects a text style, the height, width, line spacing and font is set for them automatically so no adjustments need to be made. If Italics or Underline is desired, it can be selected through the MicroStation Text Editor.

The standard text style to be used for general purpose annotation is called 07" ENG-100. This style is set by default and attached to all CDOT Seed files. The standard text style for Title Text annotation is called 10" ENG-100. The compressed width or Mono spaced text styles can be used at the designer's discretion. Normally the Mono spaced text is to be used in tables that contain numbers, and the compressed or 80% width can be used where space is limited. There are several larger size text styles available, however these sizes are normally only used on the Title Sheet or on presentation or exhibit work.

[Place Text with Text Style](#)

[Review all available CDOT Text Styles](#)

#### 5.4.1 Attached Text Style Library

The naming convention for CDOT text styles includes the "Posted" height (07"), the Font name (ENG) which equates to the Engineering font found in the CDOT Font Resource file and the "Posted" text width (80) or 80% (.056) of the 100% (.07") width.

#### 5.4.2 Available Fonts within CDOT Font Resource (RSC)

The CDOT font resource file contains six customized Fonts. The default font is 1 Engineering. Both MicroStation and InRoads utilize the font number and font name to display text correctly. The text style as discussed above, calls the correct font by default. If it is not necessary for the font to be changed unless a Greek Character (ς Greek) or a Geometry Symbol (100 Geometry Symbols) is placed. A workflow has also been developed for using Greek Characters within the CDOT environment.

[CDOT Greek Characters Workflow](#)

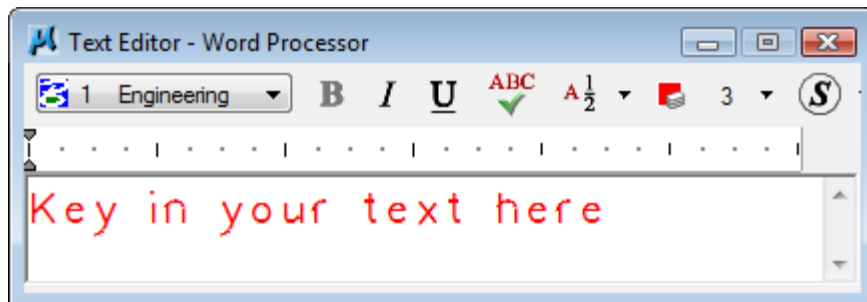
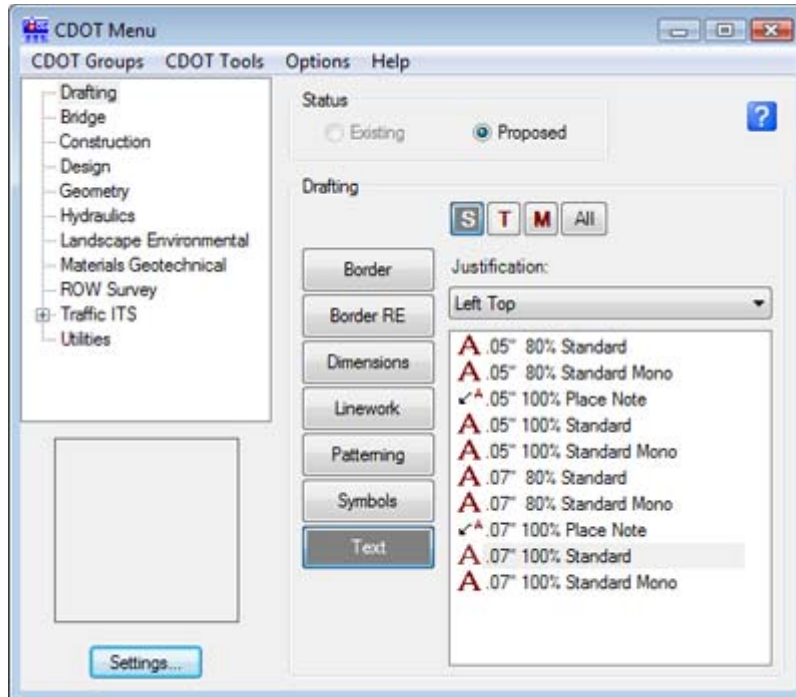
The 1 Engineering and 2 Engineering - Monospaced fonts contain stacked fractions and special characters. These fractions and characters can be placed directly from the font when available. The special character must be placed with a keyboard backslash and the number displayed above the character (210 equates to a Centerline symbol). If the character is edited in the MicroStation Text Editor, the 210 will appear as a screen font character (ς) in the editor. The character will still display correctly in MicroStation once accepted. This requirement is due to a limitation in the MicroStation software.

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## CDOT Menu text

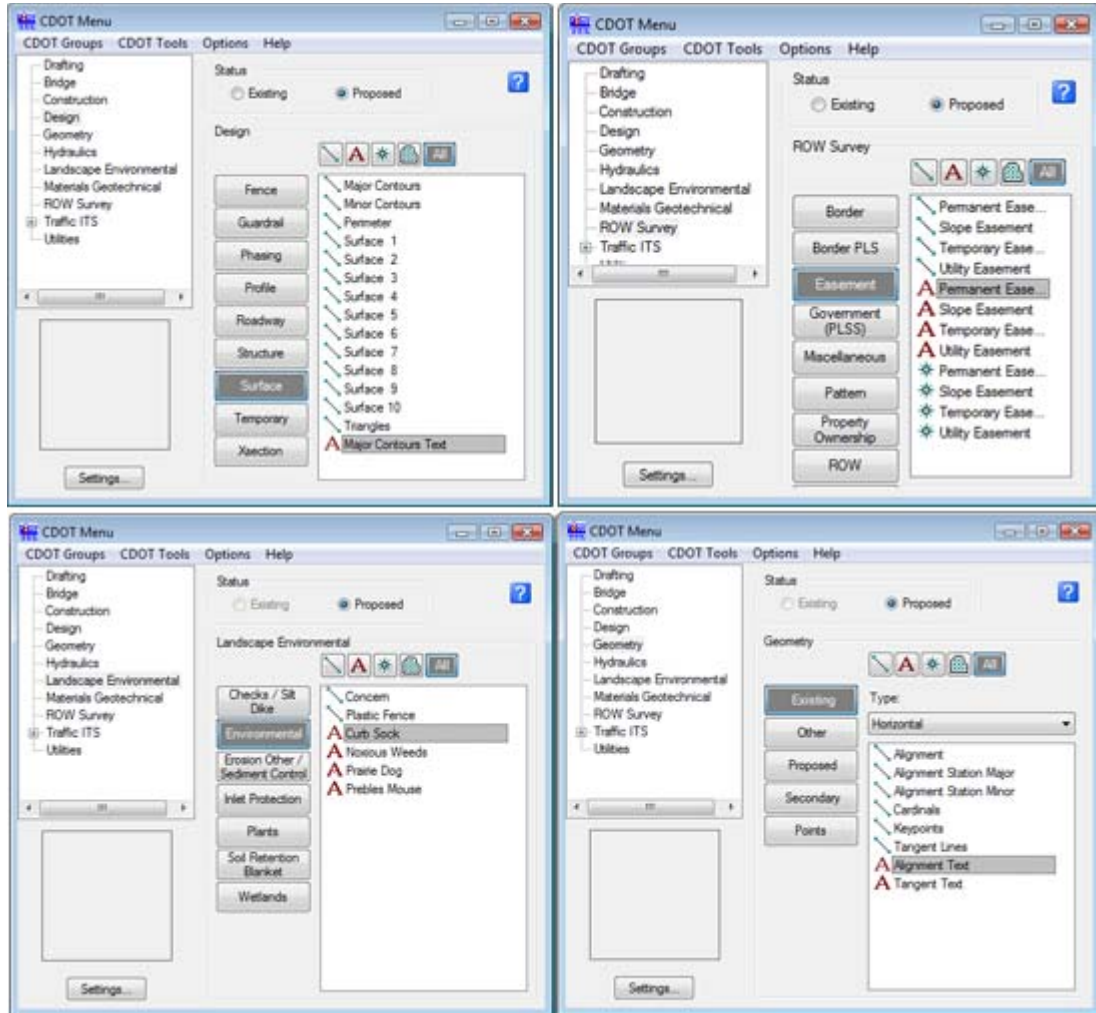
### Placing general text using the CDOT Menu

The **CDOT Menu** streamlines the text placement process by minimizing text placement options to those frequently used on CDOT drawings. Select the **Drafting > Text** group to place **Standard** or **Title** text. **Text Justification**, **Spacing** and size can be specified in one location. After setting these main text parameters, key-in your text in the **Text Editor** and then **<D>** to place the text in the file.



### Placing Specialty Group text with CDOT Menu

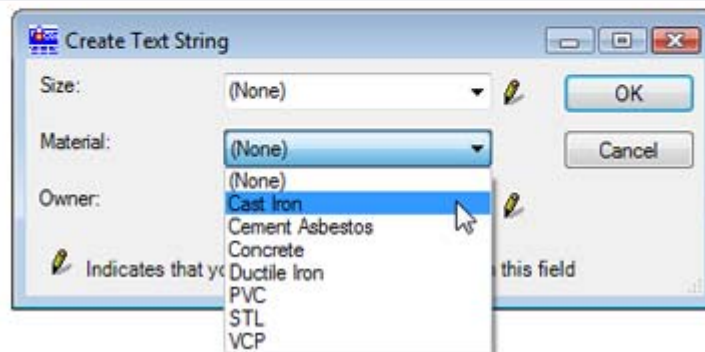
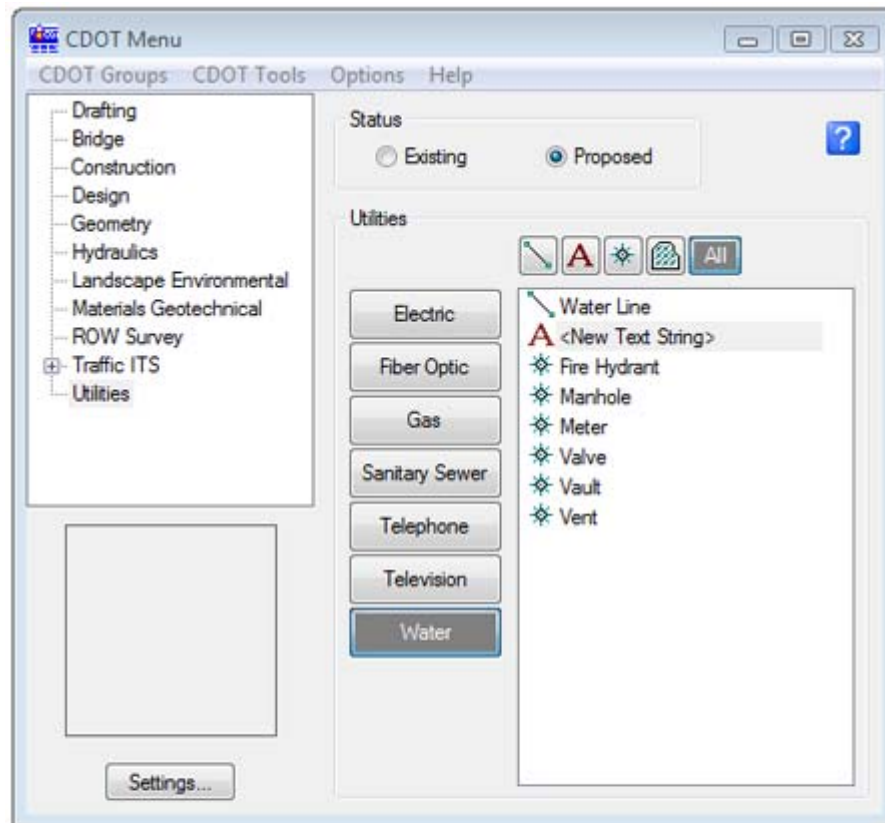
The CDOT Menu also takes the guess work out of placing specialty group text. Select the **Group** and **Category**, and the menu shows the annotation options for the different items in that group. Select the text item and all the text options are automatically set in the **Place Text** command. Just key-in your text in the **Text Editor** and then place in the file.



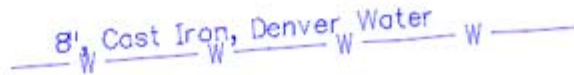
### Placing User-defined Utility text

The Utility Group on the CDOT Menu has special options for placing text that allows you to build a database of utility information and then annotate that information directly on the utility line. Each different type of utility has its own set of annotation options specific to that utility line.

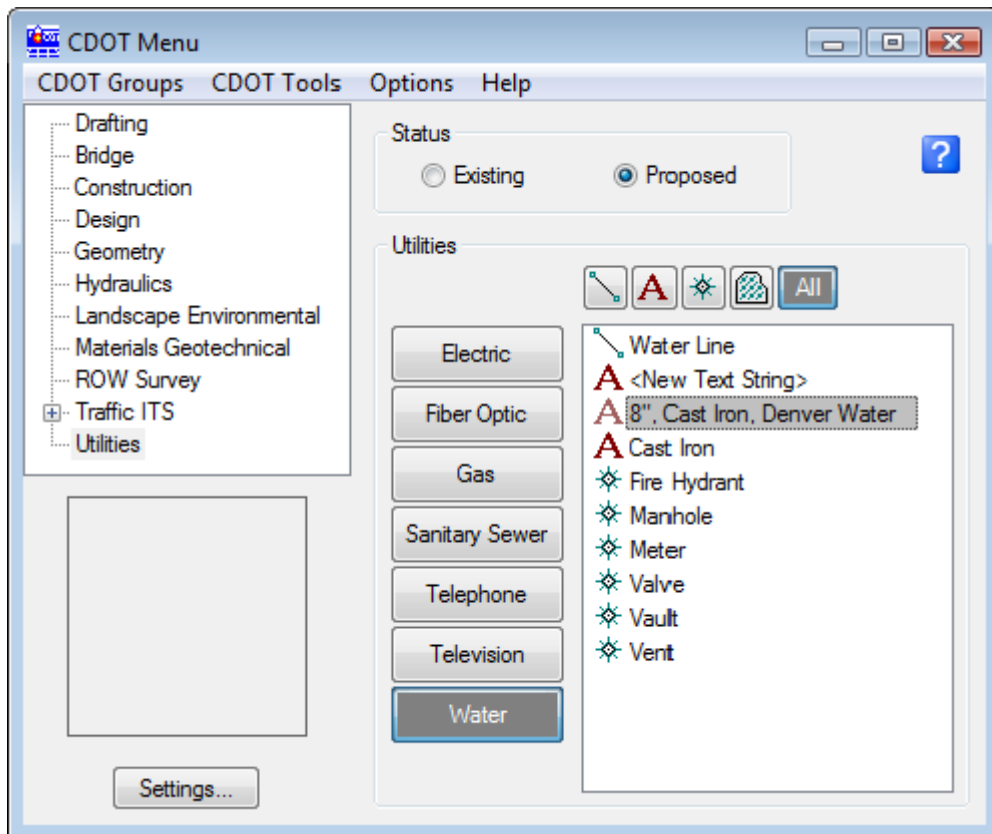
To create a new Utility text annotation, select the **Category** and then select the **<New Text String >** item. You can then select from a list of pre-defined utility features, or create new ones.



After specifying the utility line features, select **OK** and then **<D>** on the line to place the text.



You can save this text information in the CDOT item list for placement again later.





## Using the Greek characters font

If you need to place Greek characters on a drawing, then see the [CDOT Workflow, Greek Characters](#).



## Understanding Dimensions and Dimension Styles

### Dimension Styles

**Dimension Styles** provide a way of saving and applying dimension attributes in MicroStation. They function similar to the text styles, saving setups that include terminators, tolerances, units, etc. When you apply a dimension style, it's like applying a whole set of characteristics in one step. Once the style is applied, the dimension is linked to the style and any future changes to the style update all dimensions currently using the style.

CDOT Dimension styles are saved in the **DGNLIB** file **CDOT-Text & Dim Styles.dgnlib** located in the **C:\Workspace\Workspace-CDOT\Standards-Global\MicroStation\DGNlib\Standard** folder. This file is automatically attached to any MicroStation design file opened in the CDOT workspace. This is a very effective in standardizing your dimensions throughout CDOT.

### CDOT Dimension Styles

There are currently three CDOT dimension styles available:

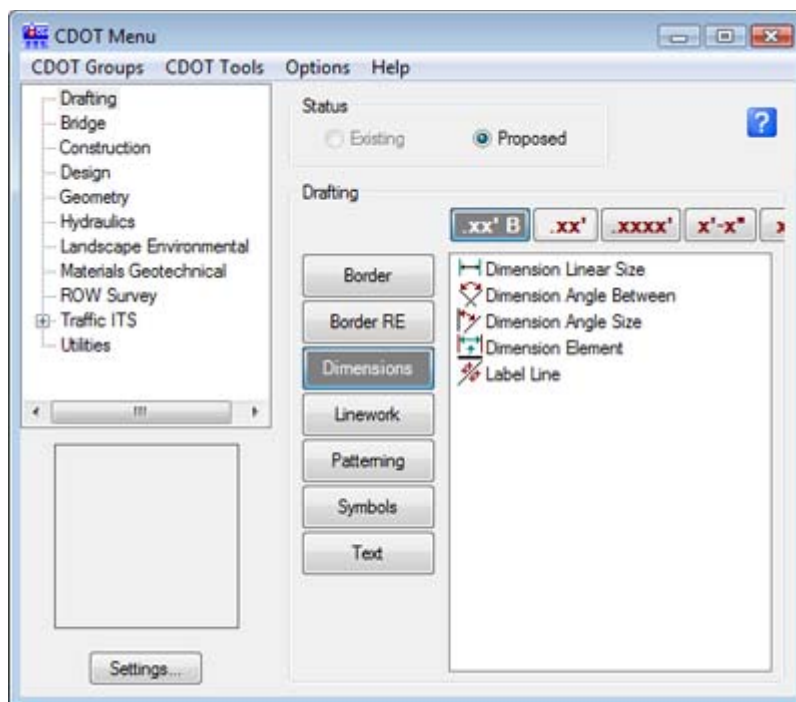
- ◆ CDOT 1 – Accuracy of 0.1234
- ◆ CDOT 2 – Accuracy of 0.12

- ◆ CDOT 3 – Feet and inches.
- ◆ CDOT 4 – Accuracy of 0.12 B spline Notes
- ◆ CDOT 5 – Accuracy of 0

**Note:** All CDOT Dimension styles have the option **Reference scale** turned **on**. This allows you to dimension reference graphics actual size if the reference attachment was scaled.

### Placing Dimensions using the CDOT Menu

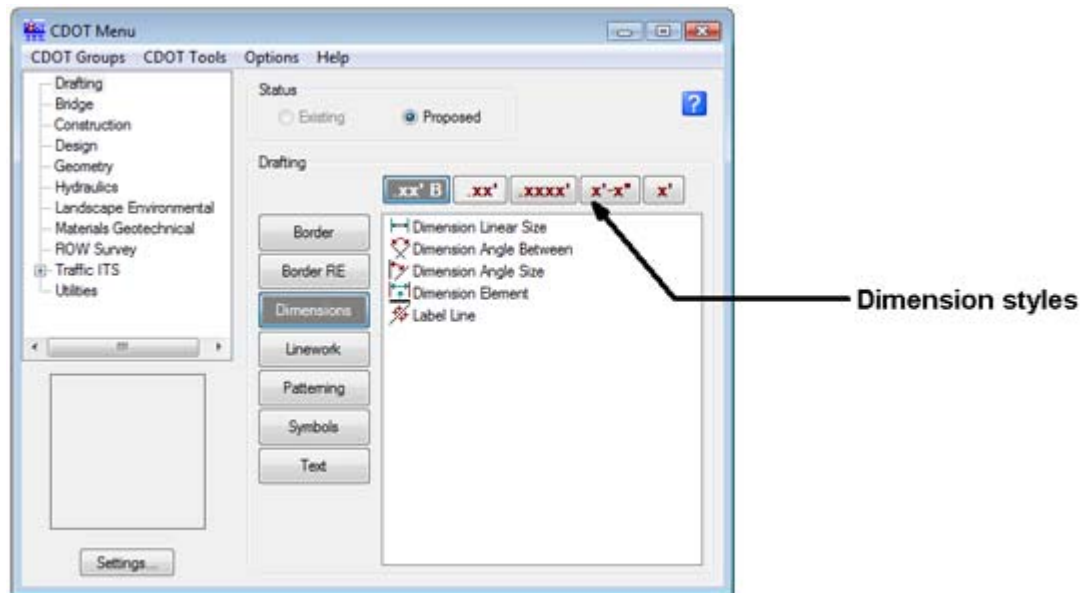
The CDOT Menu streamlines the process of dimensioning elements. From the CDOT Menu Explore select **Drafting**, set the category to **Dimensions**. Five Filters represent the different dimension styles in the configuration.



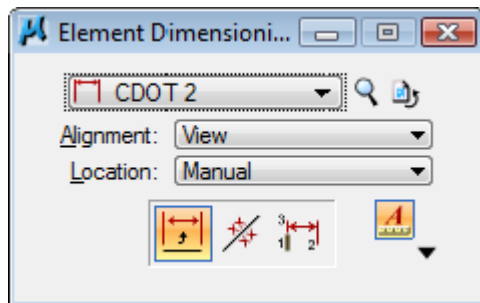
There are five options for each **Filter** or dimension style:

- ◆ Dimension Linear Size – Dimensions size by specifying a start and end point.
- ◆ Dimension Angle Between – Dimensions the angle between two points.
- ◆ Dimension Angle Size – Dimensions the angle between lines.
- ◆ Dimension Element - Dimensions an element (line, linestring, shape, arc, or circle).
- ◆ Label Line – Labels a line with a bearing and/or distance and labels the line.

The three accuracy options, .1234, .12 and x'-xx" allow you to specify the CDOT dimension styles CDOT 1, 2 or 3.

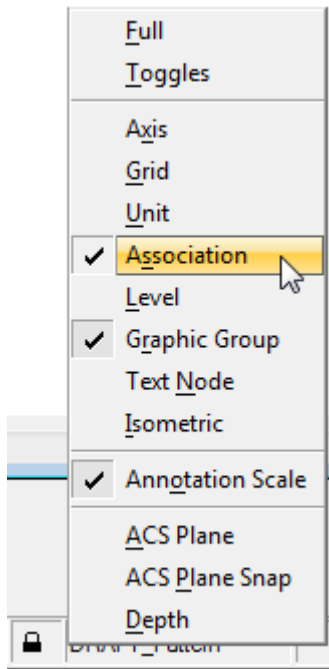


The menu automatically selects the proper dimension command and active level for placing the dimension.



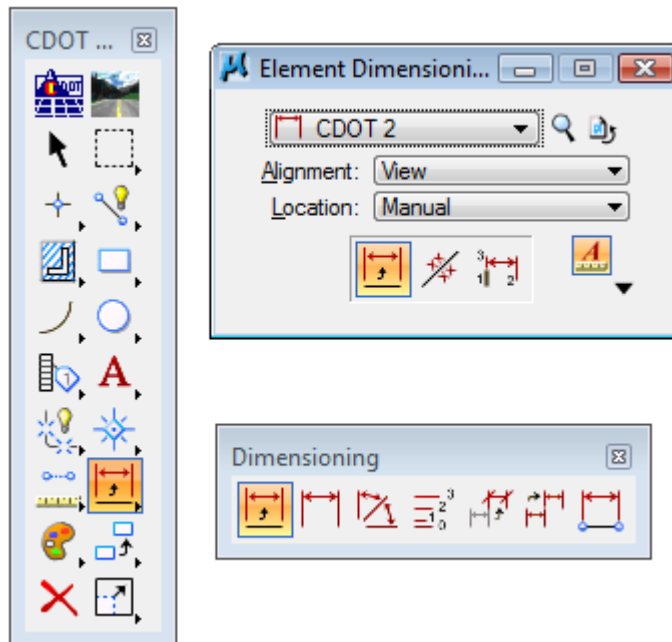
Toggle on **Association** if you want the dimension to update if the element is modified. Associative dimensioning also works for reference elements.

**Note:** You must turn on the **Association** lock in order to activate the **Association** toggle in the dimension command.



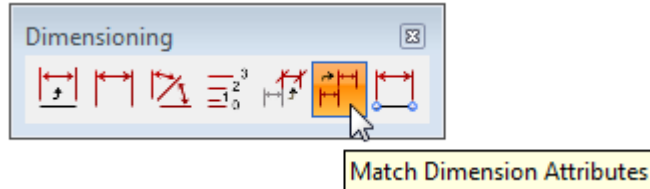
### Dimension toolbar

In addition to the CDOT Menu, you can also use the **Dimensioning** toolbar to place dimensions. However, the most common dimensions are on the toolbar.



### Using the Match Dimension tool

If there are existing dimensions in the design file, you can match the dimension and then place it again using the dimension command on the toolbar.



### Plotting

#### Workflows

CDOT has established workflows for plotting to either 11" x 17" printers or plotting to Adobe Portable Document Files (PDFs). These workflows include MicroStation Printing for single sheets or Batch Printing for printing multiple sheets or PDF files. See the CDOT Workflows for more information.



### CDOT Work Flow

**Work Flow :**

- [CDOT Alignment Display in Cross Section.Ink](#)
- [CDOT Annotating Horizontal and Vertical Alignments.Ink](#)
- [CDOT Batch Printing.Ink](#)
- [CDOT Batch Processing.Ink](#)
- [CDOT Configuration ReadMe file.Ink](#)
- [CDOT Converting AutoCAD Files to MicroStation.Ink](#)
- [CDOT Creating Multiple Plan Sheets.Ink](#)
- [CDOT Directory Structure.Ink](#)
- [CDOT Displaying Features in Cross Section and Profile.Ink](#)
- [CDOT Exporting Fieldbook Files.Ink](#)
- [CDOT Greek Characters.Ink](#)
- [CDOT Level Update for V03.01.Ink](#)
- [CDOT Linking MicroStation to Excel Documents.Ink](#)
- [CDOT MicroStation Printing.Ink](#)
- [CDOT Note Sheets.Ink](#)
- [CDOT PCF Management.Ink](#)

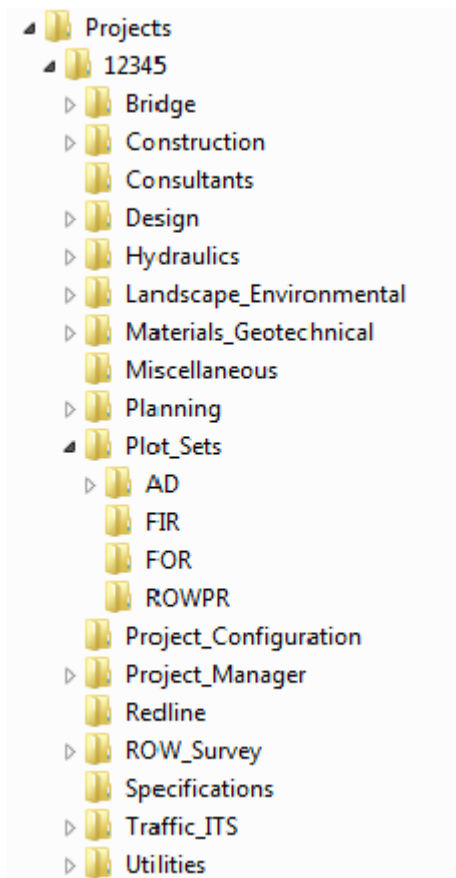
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## Printer Drivers

Five CDOT printer drivers are available to select before plotting – **CDOT-DefaultPlotter\_XM.pltcfg**, **CDOT-DefaultPrinter\_XM.pltcfg**, **CDOT-PDFDraftQuality\_XM.pltcfg**, **CDOT-PDFHighQuality\_XM.pltcfg**, and **CDOT-Shaded\_PlotterDriver.pltcfg**. Choose the first or second if you're plotting to a plotter or printer and the third or fourth if you're plotting to PDF. Printer drivers control plotting devices, plot sizes, CDOT pen tables, etc.

## Location of PDF files

When plotting to PDF files, they should be placed in the project's **Plot\_Sets** folder under the appropriate subfolder, for use by the reproduction department and other disciplines for reference and review. Only final submittals should be stored in this location.



## Additional Plotting Workflows

Additional workflows regarding MicroStation printing include *Printing AutoCAD file in MicroStation*, *Printing Raster Images, Shaded Color and Grayscale Printing* and *Printer Driver Adjustments*.

The screenshot displays the Colorado Department of Transportation website. The header includes the Colorado DOT logo, the text "CADD & Engineering Innovation", and navigation links for "Intranet Home", "CDOT External", and "Search". Below the header is a secondary navigation bar with links for "Projects", "Employee Info", "Teams", "Organizations", "Resources", "Contacts", "News", and "Help". The main content area is titled "CDOT Work Flow". On the right side, there is a vertical menu with buttons for "Home", "CADD Library", "CADD Manual", "CDOT Work Flow" (highlighted with a red box), "Issue Logs", "Mtg Minutes & Agendas", "Requests & Support", "Training", and "Useful Links". The main content area contains a list of links under the heading "Work Flow :", including:

- [CDOT Alignment Display in Cross Section.Ink](#)
- [CDOT Annotating Horizontal and Vertical Alignments.Ink](#)
- [CDOT Batch Printing.Ink](#)
- [CDOT Batch Processing.Ink](#)
- [CDOT Configuration ReadMe file.Ink](#)
- [CDOT Converting AutoCAD Files to MicroStation.Ink](#)
- [CDOT Creating Multiple Plan Sheets.Ink](#)
- [CDOT Directory Structure.Ink](#)
- [CDOT Displaying Features in Cross Section and Profile.Ink](#)
- [CDOT Exporting Fieldbook Files.Ink](#)
- [CDOT Greek Characters.Ink](#)
- [CDOT Level Update for V03.01.Ink](#)
- [CDOT Linking MicroStation to Excel Documents.Ink](#)
- [CDOT MicroStation Printing.Ink](#)
- [CDOT Note Sheets.Ink](#)
- [CDOT PCF Management.Ink](#)

## Assembling Plan Sets

After you've plotted your files for a plan set, refer to the **CDOT CADD Manual, Chapter Eight – Drawing Information**, for a comprehensive listing of sheets, information to include on each type of sheet, sample project sheets and a final checklist.



The screenshot displays a web application interface. On the left is a table of contents for '8.4 Project Sheets', listing chapters from 8.1 to 8.10. The main content area shows the text for '8.4.1 Title Sheet', detailing the development process and listing standard information to include, such as title information, project-specific details, and revision data. On the right is a vertical sidebar with navigation buttons: Home, CADD Library, CADD Manual (highlighted with a red box), CDOT Work Flow, Issue Logs, Mtg Minutes & Agendas, Requests & Support, Training, and Useful Links.

**8.4 Project Sheets**

Many sheets for each project are created after the Project Manager runs the [Project Creation Utility](#) program, as described in Chapter 3. The sheets are created, named and placed in the appropriate directories for the project team's use. The following sections will address the standard sheets, outlining what should be included on them in order to achieve consistency between projects.

**8.4.1 Title Sheet**

Title Sheet development begins with the completion of the project. Title Sheet is located in the project folder under 'DesignDrawings'. The file will be named Job Project Code [TitleSheet.dgn].

Standard Title Sheet information includes:

- Title information
  - DEPARTMENT OF TRANSPORTATION
  - STATE OF COLORADO
  - HIGHWAY CONSTRUCTION BID PLANS OF PROPOSED

Project Specific Title Sheet information that must be edited per project includes:

- Federal Aid or Colorado Project Number
- State Highway Number
- Project Code Number
- FHWA Oversight and National Highway System check blocks
- Other project numbers and codes (e.g., R.D.W., U/I, or P.E.)
- Index of Revisions
- Tabulation of Length and Design Data
- Project Location Map
- Index of Sheets
- New and revised Standard Plans
- Designer blockID, e.g., Resident Engineer initials and Region information.
- Contact Information block
- Description of Project.

[Title Sheet Sample](#)

**8.4.2 Typical Section Sheet**

Typical Section sheets show a detailed, cross-sectional view of the roadway surface design. Development of the typical section sheets includes the use of custom program called CDOT Typical Section Program. This program writes graphical data to the typical section file at a scale of 1:50. All of the graphical properties such as the levels, patterns, text, and calls are set by default to CDOT standards. This drawing is located in the 'DesignDrawings\Niker and is called [Job Project Code]TypicalSection.dgn. See the [Typical Section WorkFlow](#) to learn more.

[Typical Section Sheet Sample](#)

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